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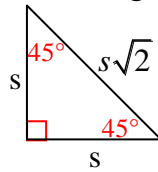
Class: Honors Geometry

Date: <date>

Topic: Lesson 7-3 (Special Right Triangles)

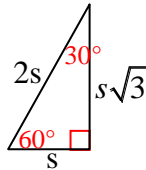
Theorem 7-8

45-45-90 Triangle Theorem



Theorem 7-9

30-60-90 Triangle Theorem



Tips

- Mental math is much faster than using a calculator.
- For these probs, answers almost always left in radical form.
- Do not leave a root/radical in the denominator of a fraction.
- Start with shorter leg when working with a 30-60-90.

Examples

1. Find len of hypot of 45-45-90 Δ w/legs of len $5\sqrt{6}$.

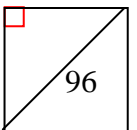
$$(5\sqrt{6}) \cdot \sqrt{2} = 5 \cdot \sqrt{6} \cdot \sqrt{2} = 5\sqrt{12} = 5\sqrt{4 \cdot 3} = 5\sqrt{4} \sqrt{3} = 5 \cdot 2 \cdot \sqrt{3} = 10\sqrt{3}$$

2. Find len of leg of 45-45-90 Δ w/hypot len 22.

$$s\sqrt{2} = 22; s = \frac{22}{\sqrt{2}} = \frac{22 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{22\sqrt{2}}{2} = 11\sqrt{2}$$

3. Dist fm 1 corner to opp corner of a square playground is 96 ft. To nearest ft, how long is each side of the playground.

$$s\sqrt{2} = 96; s = \frac{96}{\sqrt{2}} = \frac{96 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{96\sqrt{2}}{2} = 48\sqrt{2} \approx 67.88 \approx 68 \text{ ft}$$



4. Find the lengths of the legs of a 30-60-90 triangle with hypotenuse of length $4\sqrt{3}$.

$$\text{Shorter leg: } 2 \cdot s = 4\sqrt{3}; s = \frac{4\sqrt{3}}{2} = 2\sqrt{3}$$

$$\text{Longer leg} = s\sqrt{3} = 2 \cdot \sqrt{3} \cdot \sqrt{3} = 2 \cdot 3 = 6$$

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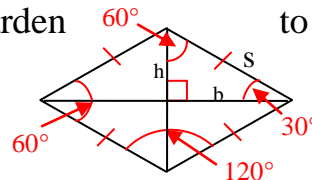
Examples cont.

5. Longer leg of 30-60-90 Δ has len 18. Find lens of shorter leg & the hypot.

$$\text{Shorter leg: } s\sqrt{3} = 18; s = \frac{18}{\sqrt{3}} = \frac{18 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{18\sqrt{3}}{3} = 6\sqrt{3}$$

$$\text{Hypotenuse} = 2s = 2 \cdot 6\sqrt{3} = 12\sqrt{3}$$

6. A garden shaped like a rhombus has a perimeter of 100 ft. and a 60° angle. Find the area of the garden to the nearest square foot.



$$4s = 100; s = 25 \quad 2h = s = 25; h = 12.5 \quad b = h\sqrt{3} = 12.5\sqrt{3}$$

$$\text{Area} = 4 \cdot \text{Area}\Delta = 4 \cdot \frac{1}{2} b \cdot h = 2 \cdot 12.5\sqrt{3} \cdot 12.5 \approx 541.27 \approx 541 \text{ ft}$$